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Tamilina, Larysa and Tamilina, Natalya

Independent Research, Greece

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Heterogeneity in Institutional Effects on Economic Growth: Theory and Empirical Evidence¹

Larysa Tamilina, Natalya Tamilina
Independent Research, Greece²

Abstract

This article explains the peculiarities of institutional effects on growth rates in post-communist countries. By proposing a certain dependence of the institution-growth nexus on the nature of institutional emergence, the distinction between revolutionary and evolutionary processes of institution formation is introduced. Theoretical and empirical juxtapositions show that transition countries' institutions which are constructed revolutionarily differ from those that emerge evolutionarily in a twofold manner in their relationship to growth. Growth rates of their economies are less likely to depend on the quality of economic institutions and are more likely to be a function of the maturity of political institutions. In addition, economic institutions in post-communist countries are a product of the quality of political bodies to a greater extent than their evolutionary alternatives.

JEL Classification: O17, O43, O57, P26, P37

Keywords: Economic Growth, Formal Institutions, Institutional Formation, Institutional Change, Post-Communist Countries

1. Introduction

The collapse of socialism led to multifaceted and profound changes in the political, economic, and social systems of post-socialist countries. Formal institutions were expected to mold these changes into a legal framework and define new rules according to which the economy and society were supposed to operate. However, introducing free market formal institutions did not lead to the expected outcomes in many of the former socialist economies. The well-functioning institutions of capitalism, which are the foundation of economic development according to growth theory, proved rather dysfunctional in post-communist conditions (Polterovich 2005, 2008; Radygin and Entov 2008). The relationship between the quality of formal institutions and rates of economic growth appeared to be peculiar, differing from the pattern usually found in developed and/or developing countries.

This study seeks to demonstrate that the revolutionary approach, through which key formal institutions were formed in post-communist countries, can explain these institutions' relative dysfunctionality and inefficiency in fostering economic growth. We argue that the revolutionary mode of institution building occurred independently from both the culture economic agents were accustomed to and trends in economic structural transformations, resulting in institutions that were incompatible with informal norms and features of local economic systems.

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² E-mails: larysa.tamilina@gmail.com, ntamilina@mail.ru

2. Literature overview

Growth theory asserts that good formal institutions are conducive to rapid economic development. Empirical evidence from economically developed and/or developing countries (Eicher and Leukert 2009) largely supports this claim (see Acemoglu and Robinson (2012) for an overview) with regard to both political (Chen and Feng 1996; Klomp and de Haan 2009; Narayan et al. 2011) and economic institutions (Rodrik et al. 2002). Post-communist countries are rarely included in such analyses, because they represent a unique group (Bosworth and Collins 2003).

Research has been conducted independently on these countries. Studies found mixed evidence depending on the type of formal institutions analyzed, statistical methods used or the range of countries included. They either substantiate conventional findings that institutions positively impact growth rates (see Aslund (2007) for a detailed overview). Or, they recognize peculiarities concerning the effect that formal institutional frameworks have on economic growth, with the sign and strength of this impact varying depending on the phase of transition or the maturity of formal institutions (Fidrmuc and Tichit 2009; De Melo et al. 1997; Falcetti et al. 2000). Studies stemming from former Soviet Union countries go even further and entirely negate the claim that free-market formal institutions per se may lead to economic prosperity in the post-socialist world (Mau 2007; Petrunya and Ivashina 2010; Polischuk 2008; Polterovich 2008). These formal institutions lack compatibility with post-communist informal norms due to transition countries' insignificant historical experience with democracy and free markets (Yasin 2003) or due to unique features of their economic systems (the military sector's prevalence in their production capacities, dominant large companies, and a deep recession that started at the outset of transition) (Polterovich 2005; Polterovich and Popov 2006).

In addition, the lack of strong political context, which assumes an independent political sector from the economic sector, is believed to hinder these countries from improving formal institutions. Their political elite often become economic elite (Aslund 2007), as a result of which institutional reforms simply promote the redistribution of economic or political power without generating substantial economic growth (Dementiev and Vishnevskiy 2011). As a consequence, many transition economies appear to be locked in an institutional trap (Polterovich 2005), with any institutional improvement being associated with considerable economic and social losses (Polterovich 2008). The introduction of private property in Russia and the Ukraine exemplifies this process: Local managers with close connections to the regional government accumulated hundreds of thousands of hectares while most of the local population was deprived of land. This practice led to a considerable output drop and increases in poverty levels.

Irrespective of the sign found in the relationship between formal institutions and economic growth, studies on transition economies possess one common feature: The impact of their formal institutions on growth is rarely tested in conjunction with developed and/or developing countries. An indirect comparison of results is hardly possible, since analyses do not use a standard set of conditioning variables and standard periods that would enable comparing findings.

One should note that, in general, growth theory recognizes the existence of heterogeneity in the effects of formal institutions. It is well-established that the direction or strength of institutions' impact on growth varies depending on the maturity level of formal institutions (Barro 1997; Fidrmuc and Tichit 2009; Przeworski and Limongi

1993) or a country's level of economic prosperity (Eicher and Leukert 2009; Lee and Kim 2009). However, we doubt that these two explanations are exhaustive for all post-communist countries. Transition economies started their institutional reforms from a relatively similar platform in terms of their level of economic development (see appendix 1) and the type and degree of institutional maturity but ended up at very different success levels. We argue that the cross-country variation of institutional effects on economic growth can also be attributed to the way in which such institutions were formed. The peculiar relationship of economic institutions to growth rates in transition economies can also be explained by the revolutionary nature of their institution building and socio-economic forces resulting from this process.

The latter proposition requires that a theoretical model be constructed to juxtapose the post-communist pattern of institution building with the pattern prevalent in other countries to identify implications that this mode of institution formation may have for a country's growth dynamics. This study adopts the conventional definition of formal institutions as the basic formal rules, such as laws and regulations, that govern interactions among economic agents. We further narrow the concept of formal institutions to legal economic institutions, such as property rights and contract enforcement legislation, since they are viewed as the key to economic growth (North 1990) and have been the least successfully reformed in post-communist countries (Aslund 2007).

3. Analytical model

We assume that economic processes have certain characteristics and operate within a system of rules. Some of these rules require legislative action and others do not. Rules that do not necessitate legislative action constitute informal institutions. Rules needing such action are formal institutions. We further assume that any legislative action is ascribed to formal rules and enforced by the central government, which operates within a set of political rules. We argue that an economy grows smoothly when formal rules are compatible with informal rules and features of political and economic systems. We also assert that the odds of ensuring this compatibility vary depending on the mode of institutional grafting.

Economics offers two primary views on how formal institutions emerge: top-down and bottom-up (Boudreaux and Alicia 2007; Easterly 2008). The bottom-up perspective assumes that institutions develop spontaneously from cultural values and norms of individuals within a society, with the written law only formalizing what is already mainly shaped by people's attitudes (Easterly 2008). In this case, institutional change is seen as gradual in nature and constrained by previous institutions while institutional reforms are expected to be additive and cannot attempt too much (Platteau 1996). Drastic changes in the existing institutions are believed to harm the economy, even if there is no obvious reason for such institutions to exist (Easterly 2008). Institutions are deemed unique to a society and closely linked to its history. As such, societies are expected to diverge in their formal institutions both in the short and long run (Boudreaux and Alicia 2007).

In the top-down approach, by contrast, political leaders declare laws to create institutions (Easterly 2008). Since the notion of institutions is limited to laws, the government can easily adopt new institutions at any time. Derived from this premise, this approach advocates determining an optimal set of formal institutions that can be designed from scratch and introduced in any country (Boudreaux and Alicia 2007).

Some go even further and suggest that there might be “one globally unique best set of institutions, towards which all societies are thought to be developing” (Easterly 2008). Hence, copying institutions from more advanced societies to less advanced ones is deemed possible and efficient.

We use this distinction as a point of departure and integrate it into evolutionary and revolutionary modes of institutional grafting (Matthews 1995; North 1990; Poznanski 1995). We consider the two latter terms to be of higher order, since they assume that a certain method of institution building is applied not only to one or a few selective formal institutions but to the vast majority of such institutions, resulting in a profound transformation of the entire institutional framework. For the purpose of our research, we adopt the conventional concept “evolutionary,” which is often used in institutional economics, and limit it to a gradual and cumulative change in institutions that usually results from a bottom-up emergence of rules (Easterly 2008). We use the term revolutionary institution building when referring to an abrupt and profound alteration of the entire institutional framework that presupposes the design of new institutions from scratch while relying on a top-down approach. One should note that the term “*revolutionary*” does not entail violence in the institutional change process but rather emphasizes the radical nature of transformations in the existing institutional framework.

We argue that if an evolutionary mode of reforms is implemented, which largely rely on the bottom-up emergence of institutions, such institutions are expected to be a positive determinant of economic growth. If a revolutionary method with a top-down approach to creating formal institutions is applied then new formal rules are likely to play an insignificant role in promoting economic growth, at least in the short run. Such institutions are expected to be incompatible with informal norms, political traditions, and features of local economic systems. The extent of such incompatibility will be determined by the pressure that economic agents exercise concerning introducing new formal rules, whether the new rules are appropriate for the maturity level of the economic system, previous historical experience with similar rules, or the population’s desires to conform their behaviors to the new political and economic orders.

To demonstrate the validity of the above arguments, we use Portes’s sociological model of institution building (2006). According to this conceptual framework, institutional grafting is influenced by a dual set of forces. On the one hand, there is culture which consists of moral values and norms that manifest themselves in certain role expectations regarding the conduct of economic agents or representatives of authority. On the other hand, there is social structure that includes power and elites who are embedded within a certain class structure with a clearly specified status hierarchy. The theory asserts that institutions, regardless of their formation mode, should be compatible with the culture and social structure to function successfully. If institutions emerge from social norms, customs, beliefs, or traditions within a society (Easterly 2008), dominant classes and political elites must be persuaded or compelled to legalize them (Portes 2006). If imposed by political elites, institutional change must presuppose an alteration of the underlying values to enable their cultural acceptance (Portes 2006).

We expand this approach by arguing that successful institution building is embedded within a three-dimensional structure, and three oppositional forces to institutional change may result if this structure is not complied with. The first dimension is culture as in Portes (2006). It includes prevalent values/norms that dictate right and wrong, as well as behaviors describing how likely it is that an individual’s conduct

deviates from their good morals. The second dimension is social structure, where we follow Portes (2006) by distinguishing between political elites who formalize institutions and class structure, which predefines the population's potential level of deliberate resistance to institutional change. The third dimension is economic structure, which describes the rationale behind and the nature of economic arrangements and economic infrastructure in a country. It may include financial and banking systems, taxation, trade union, labor market institutions, industrial relations, etc. It determines the extent to which a country's economic system, and economic processes embedded within that system, are in tune with the logic of formal institutions. Hence, compatibility is expected to exist between formal economic institutions and these three dimensions.

If analyzed within this theoretical framework, the logic of the evolutionary approach can be described as follows. As economic agents operate, they accumulate knowledge and experiences, which lead to technological change and further promote the division of labor (Davis 2010; Groenewegen et al. 1995). This shifts the organization of a country's production processes and, hence, results in alterations to economic structures. Profound change in the economic domain leads to transformations in how economic agents think and the values they hold. As a result, existing formal institutions are no longer adequate and commensurate with both economic structures (i.e. prevalent technologies, economic processes) and preferences among economic agents, thereby raising market transaction costs (North 1990). Contractual arrangements begin to create demand for institutional change that can lower transaction costs to exploit new opportunities (Pejovich 1999). In trying to overcome the existing inconsistencies, economic agents introduce informal changes (Eggertsson 1997) among formal "rules of the game," thereby making the institutional framework more flexible.³ If efficient and compatible with the interests of political elites (Portes 2006), these changes are captured by the political system, which formalizes and legalizes them. As a result, they acquire the status of formal institutions. Private international commercial law provides an example of evolutionary institution formation (Boettke et al. 2008): The development of cross-culture exchange in 11th- and 12th-century Europe led to the spontaneous formation of the *lex mercatoria*, an informal system of customary law rooted in international commercial norms (Boettke et al. 2008). These informal institutions appeared to be effective and were later formalized into international commercial law.

Hence, the logic of institutional evolution entails the following: First, the formation process is initiated by economic agents through the bottom-up approach and, therefore, new institutions are likely to be consistent with the values economic agents hold. Second, formal institutions are fully compatible with existing economic structure, since changes in the old institutions primarily occur as a reaction to shifts in the economic system or technologies. Third, the role of political elites in institution creation is relatively insignificant and restricted to formalizing institutions that previously emerged at the micro-level. The flexibility of political bodies, however, determines how rapidly new institutions that meet such demand are adopted (Davis 2010).

The distinct feature of the revolutionary approach to institution formation is that shifts in a country's political system, often triggered by a political regime change, precede changes in its economic system (Fidrmuc 2003). Such reforms rarely require the population's broad support, since the economic crisis caused by the previous regime's shortcomings serves to justify introducing essential alterations in both political and

³ See Groenewegen et al. (1995) or Knight (1992) for possible explanations of how inconsistencies between formal rules and changed economic conditions can be resolved.

economic systems (Olson 1982). Alternatively, the population's dissatisfaction with the current regime can encourage citizens to demand changes in both political and economic domains even if the incumbent elites resist such reforms. Radical political change can occur either through revolutions (Acemoglu and Robinson 2012), as recent events in Arabic countries demonstrate, or in a peaceful manner without wars and coups (Olson 1982), as in the majority of post-communist countries during the collapse of socialism (Aslund 2007).

Radical political alterations require adjusting the institutional framework to the new political logic and promote an immediate introduction of an entirely new set of formal economic institutions, commensurate with the logic of the new political regime. During this process, political elites and public and private actors usually have limited knowledge about the way the new economic system should function. As such, the process of building a new institutional framework relies on the top-down approach and often involves borrowing legal rules from countries with political and economic orders close to those desired in the new conditions. Instead of stemming from local cultures or economic structures, the formal rules are therefore imposed from without (Pejovich 1999). This, in turn, can lead to two kinds of problems.

On the one hand, implanting foreign institutions into a specific local context through the top-down method often lacks an appropriate analysis of their compatibility with characteristics of local economic structures. When copying Western industrial legislation designed for postindustrial societies with a prevalence of medium and small businesses, many CIS governments did not, for instance, take into account that their economies are still characterized by the overrepresentation of large enterprises (Polterovich and Popov 2006), which made new rules *a priori* suboptimal for the existing economic systems. Reforms aimed at enforcing changes in economic structures and bridging the divide between the recipient- and source-countries of formal institutions become necessary, but in practice are often left to random forces with institutional change expected to generate the required structural change (Eggertsson 1997).

On the other hand, a similar inconsistency is also believed to emerge between new formal institutions and cultures (Kyriazis and Zouboulakis 2005; Portes 2006). Since transition countries are highly likely to possess their own mentality, behavioral patterns, and business cultures (Chavance 2008; Matveenko 2005; Tridico 2006), their economic agents often interpret newly imported formal institutions in markedly different ways from their initial context. This may result in a mutation of the new formal institutions (Vernikov 2009) or low enforcement levels (Portes 2006).

The learning experience is expected to minimize or eliminate both kinds of inconsistencies (Nelson and Sampat 2001). If policymakers design and introduce adjustment policies for the system's orderly operation at each stage during the transition period, the incompatibility between the new economic institutions and economic structures is believed to be gradually narrowed. Similarly, if economic actors learn that adapting to the new economic institutions can expand their opportunity set, they may change their cultural values and behaviors. For instance, post-communist countries in which new democratic governments successfully introduced economic reforms experienced a rise in pro-democratic attitudes among citizens (Aslund 2007). Successful reformers have also nurtured strong support for a free-market economy (Aslund 2007). These learning processes imply, however, that there are lags between fundamental institutional change being initiated and the time when the relevant actors get the

structures right (Eggertsson 1997), producing a positive impact for the local economy only in later periods (De Melo et al. 1997; Falcetti et al. 2000).

Japan's post-war reconstruction, which included changes in the political regime, major economic rules, and legislation, is a good example of the revolutionary approach to institutional grafting (Boettke et al. 2008). Overall, the revolutionary mode of institution formation includes the following features: First, the formation of economic institutions is handled by political elites through the top-down approach, and hence, it is likely that these institutions will be incompatible with the existing values, at least at the initial stage of institutional reforms. Second, the top-down approach to institution building can create inconsistencies between economic institutions and the current economic structure. Third, the role of political elites is superior and cannot be confined to legalizing new institutions, but extends itself to their selection, design, introduction, and subsequent adjustment to existing values and economic structures.

In sum, institutional change is an evolutionary one when: (1) it is not accompanied by a political regime change; (2) new institutions mainly emerge through a bottom-up approach; and (3) new formal institutions are initiated by economic agents as a result of their functioning based on existing values and within existing economic structures. If institutional transformations result from top-down institutional reforms, the pattern remains evolutionary in nature so long as only some aspects of the existing institutional framework are subject to radical alterations, and the entire institutional framework's logic remains unchanged. A good illustration of this is the opening of previously closed professions in Greece, which required only certain adjustments in the competition law. Profound institutional change can also happen, but it remains gradual in nature, with substantial alterations in formal institutions or in the entire institutional framework occurring relatively slowly (Efendic et al. 2011), giving enough time for values and economic structures to co-evolve with institutions and to adapt to the new rules. The pattern turns into a revolutionary one if alterations: (1) are imposed by changes in political institutions that primarily occur as a result of a political regime change; (2) abruptly transform widespread areas of the entire institutional framework; and (3) new institutions are designed from scratch by the government rather than economic agents and usually emerge by replicating institutions from more advanced societies through a top-down approach.

The difference between the two modes of institution building can be demonstrated by juxtaposing China with former Soviet Union countries. China is an example of evolutionary change: It preserved the existing communist one-party political regime and gradually shifted to capitalism by introducing economic and legal reforms in only certain aspects of competition policy, pricing policy, etc. In contrast to China, many post-communist countries transitioned from socialism to capitalism through a revolutionary process of institution building. These countries started their transition by changing their political regimes. Their entire institutional frameworks have been subjected to substantial alterations through top-down reforms to abruptly dismantle communist institutions and introduce capitalist ones: private property rights protection, free competition, etc. Even those institutions that were preserved from the previous regime, such as courts, underwent substantial alterations. New formal institutions were designed by central governments from scratch by replicating institutional sets from more advanced West-European societies.

Understanding the main differences between evolutionary and revolutionary modes of institution formation allows us to formulate four propositions for growth

theory. *Proposition 1:* Economic institutions that emerged in a revolutionary way might be less effective for economic development than those formed through the evolutionary mode, since they are less likely to be compatible with features of local economic structures and cultures, at least in the short run.

Proposition 2: Since revolutionary institutional change involves a learning process for both political elites and economic agents, there will be lengthy lags between the initiation of fundamental institutional change and the time when institutional frameworks are optimized. Political elites need time to experiment and learn how to design and operate new formal institutions. In turn, economic agents must learn how to act according to the new rules. Common sense also suggests that the learning process might be non-linear, hence, as institutional elements approach optimal design, they must induce better learning.

Proposition 3: Since the revolutionary mode of institution building presupposes radical change in the set of formal institutions, a country's economic growth becomes a function of the ability of political elites to ensure a smooth transition to new institutions, and if necessary, to introduce measures aimed at tailoring and adjusting economic structures and/or cultures to the new rules of the game. By contrast, the evolutionary pathway is mainly characterized by the introduction of insignificant cumulative changes into existing institutions that seldom require such adaptation measures or coordinating actions on the part of the government.

Proposition 4: Since the revolutionary mode requires more involvement from political elites during the institutional formation phase and includes a greater degree of learning, the quality of economic institutions largely becomes a function of the experience and skillfulness of politicians in dealing with institutional grafting. Their ability to minimize the difference between current features of economic structures, cultures, and newly introduced institutions determines whether the institution creating processes are successful and newly imported formal economic institutions survive and function effectively.

Based on these propositions, we deduce five hypotheses:

Hypothesis 1: The positive impact of economic institutions on economic growth is greater when such institutions are formed evolutionarily rather than via revolutionary change.

Hypothesis 2: An improvement in economic institutions is associated with (a) lagged and (b) non-linear improvements in rates of economic growth when such economic institutions are formed revolutionarily.

Hypothesis 3: The positive impact of a national political system's quality on rates of economic growth is greater when institution formation occurs via revolutionary change rather than via evolutionary change.

Hypothesis 4: The quality of formal institutions are more dependent on the national political system's quality when such institutions are formed via revolutionary change rather than via evolutionary change.

Hypothesis 5: If institutional reforms occur via revolutionary institutional change, countries that minimize incompatibilities between new formal economic institutions as well as their values and economic structures are associated with greater improvements in their formal institutions.

4. Data and method description

To test these hypotheses, we use Eicher's and Leukert's (2009) approach of splitting the sample into subsamples and conducting an empirical analysis for each of them. In forming our subsamples, we use the idea that revolutionary institutional change presupposes a simultaneous transformation of the entire framework of formal institutions. Since such a radical transformation usually occurs because of a shift in the nature of economic relations and the logic of economic processes, we assume that only a political regime change can initiate revolutionary institutional reforms. This means that in choosing countries for our sample, the type of political regime and form of autocracy or democracy which the selected countries have was irrelevant. Instead, what matters is whether there was any sudden transition from one political regime to another. This idea is also in line with the hierarchy of institutions hypothesis, which assumes that formal economic institutions are a function of political institutions within which a certain political regime is embedded.

To identify whether a country has experienced recent changes in its political regime, we use the POLITY IV Project's website (<http://www.systemicpeace.org/polity/polity4.htm>), which provides information about political regime characteristics and transitions between 1800 and 2012 with a polity score for a wide range of countries (see appendix 2 for a country choice description). The values of a country's annual polity score range from -10 to 10, with values 6 and above denoting full democracy and -6 and below denoting full autocracy. In our analysis, a country qualifies as revolutionary if: (1) there was a political regime change in which values shifted from at least -6 or below to at least 6 and above; (2) this change is rapid and occurred within a few years; (3) this change occurred after 1970. Any earlier transition is expected to produce institutions that would adhere to the local structural and cultural characteristics through the learning process and eliminate any inconsistencies. In this case, the new formal institutions would follow an evolutionary path in their maturation process; (4) the change is stable with no signs of reverting to the previous regime in the following years; (5) there have not been persistent fluctuations in the regime trend of more than 3 points since 1970. Regime trend fluctuations denote political instability, which is a separate issue with respect to growth analysis and has both positive and negative effects on economic development (Jong-A-Pin 2009).

Since we are primarily interested in transition economies, our base revolutionary subsample only includes 21 post-communist countries that initiated a transition to democracy with a free market economy. One should note that these countries are relatively heterogeneous in their historical trends (Soviet Union membership, experience with private property during communism, etc.) and present characteristics (EU membership, democracy types, etc.). We justify unifying them in one sample, because they all had a one-party political regime during communism with a centrally planned economic system. And they all underwent a profound institutional transformation with the same target: transition to a free market economy and the introduction of democracy, which involved a radical change in the rules governing both political and economic processes. The fact that they differ in their starting points does not contradict the purpose of our analysis, since the quantitative impact of initial conditions on the set of reforms and economic growth is small and tends to rapidly decline over time (Berg et al. 1999; Falcetti et al. 2000). To ensure that the empirical results are not unique to post-communist countries, we expand the revolutionary subsample by including non-post-

communist countries that meet the above criteria, thereby increasing this subsample to 42 countries.

Countries that have not experienced political regime change or have experienced profound but gradual change (each stage of change not being greater than a 3-point fluctuation in the polity score) are considered evolutionary. The base evolutionary subsample is limited to 22 old and stable democracies or autocracies to avoid a disproportionate subsample size. Since most of these countries are relatively advanced in their economic development, we expand this subsample by adding other developed and developing countries and augmenting the subsample's size to 45 countries. These countries are also heterogeneous in their characteristics but have one feature in common: There has not been any rapid change in their political regime. Appendix 3 lists the countries included in the subsamples.

We are primarily interested in comparing how formal economic and political institutions impact economic growth for the two country groups: evolutionary and revolutionary. The quality of economic institutions is approximated through a contract enforcement and property rights protection index sourced from the 2007 annual report of the Economic Freedom of the World (Gwartney et al. 2007). The values vary from 1 (poorly defined economic institutions) to 10 (well-defined economic institutions). Formal institutions are considered to be good when they are clearly defined and well-enforced, which means that the selected institutional scores are closer to 10.

The quality of political institutions is measured through the control of corruption in government, government effectiveness, the quality of regulation, and voice and accountability. All political indexes are sourced from the World Bank Group database and vary from -2.5 (bad political situation) to 2.5 (ideal political situation). The four indexes are highly correlated, with the voice and accountability index showing the greatest uniqueness in its variance (see table 1). We use this index to describe the quality of democratic settings in a country. The three remaining indexes are combined by using the STATA *predict* option for factor analysis to construct a single measure of the policymaking quality.

Table 1. Factor loading and unique variances for political scores

| VARIABLES | Factor | Uniqueness |
|----------------------------------|--------|------------|
| Voice and accountability | 0.894 | 0.162 |
| Government effectiveness | 0.972 | 0.038 |
| Regulatory quality | 0.953 | 0.073 |
| Corruption control in government | 0.948 | 0.065 |

Table 2 presents descriptive statistics for the key variables (see table 2).

Table 2. Descriptive statistics for key variables of the extended subsamples

| VARIABLES | No. of observations | Mean | St. Dev. | Min. | Max. |
|-----------------------------|---------------------|--------|----------|---------|---------|
| The evolutionary subsample | | | | | |
| GDP per capita growth | 552 | 2.871 | 3.532 | -6.060 | 31.800 |
| Legal institutions | 436 | 6.827 | 1.917 | 1.200 | 9.600 |
| Corruption perception index | 480 | 6.104 | 2.490 | 1.300 | 10.000 |
| Democratic settings quality | 470 | 0.286 | 1.221 | -2.243 | 1.826 |
| Policy-making quality | 479 | 0.219 | 0.990 | -2.165 | 1.516 |
| Gross capital formation | 566 | 22.721 | 8.334 | 8.000 | 114.000 |
| Inflation | 550 | 4.497 | 6.152 | -13.800 | 57.100 |

| | | | | | |
|-----------------------------|-----|--------|--------|---------|---------|
| Life expectancy | 576 | 73.010 | 8.917 | 35.000 | 85.000 |
| Social trust | 216 | 0.382 | 0.151 | 0.150 | 0.700 |
| Freedom of choice | 204 | 6.992 | 0.704 | 5.720 | 7.870 |
| Obedience | 216 | 0.316 | 0.142 | 0.060 | 0.610 |
| Tolerance | 216 | 0.786 | 0.084 | 0.610 | 0.920 |
| Latitude | 576 | 0.366 | 0.198 | 0.014 | 0.711 |
| Civil liberties | 312 | 1.821 | 1.394 | 1.000 | 6.000 |
| The revolutionary subsample | | | | | |
| GDP per capita growth | 528 | 3.466 | 4.624 | -37.360 | 26.000 |
| Legal institutions | 389 | 5.183 | 1.225 | 1.900 | 8.700 |
| Corruption perception index | 424 | 3.557 | 1.343 | 0.400 | 7.500 |
| Democratic settings quality | 450 | 0.150 | 0.628 | -1.584 | 1.218 |
| Policy-making quality | 448 | 0.113 | 0.969 | -2.939 | 2.215 |
| Gross capital formation | 523 | 23.296 | 7.205 | 4.000 | 75.000 |
| Inflation | 509 | 9.914 | 12.978 | -9.600 | 121.600 |
| Life expectancy | 528 | 67.398 | 8.858 | 41.000 | 80.000 |
| Social trust | 348 | 0.228 | 0.072 | 0.060 | 0.470 |
| Freedom of choice | 348 | 6.451 | 0.675 | 5.370 | 7.480 |
| Obedience | 348 | 0.318 | 0.123 | 0.150 | 0.560 |
| Tolerance | 348 | 0.647 | 0.088 | 0.470 | 0.830 |
| Latitude | 528 | 0.358 | 0.184 | 0.056 | 0.667 |
| Civil liberties | 372 | 2.753 | 1.226 | 1.000 | 5.000 |

To test our hypotheses empirically, we use the dynamic GMM method proposed by Arellano and Bond (Arellano and Bover 1995; Blundell and Bond 1998). The procedure for applying this technique is well-documented by Pääkkönen (2010), Lee and Kim (2009), and Eicher and Schreiber (2010). It requires that the equation is first-differenced to eliminate the heterogeneity in production functions and then an instrumental variable method is applied on the differenced model, with lagged values of the endogenous variables used as instruments for the variables themselves. To avoid an overfitting bias, we often restrict instruments to only the first, second, and third lags of the respective variables, since they usually correlate most closely to the major explanatory variables (Pääkkönen 2010). We further use the STATA *collapse* sub-option to create one instrument for each variable and lag distance rather than one for each time period, variable, and lag distance. We also add the sub-options *small* to request small-sample corrections to the covariance matrix estimate. We calculate a two step estimator instead of a one step. To demonstrate the correctness of the model, we report the number of instruments generated by the model, the results from a Hansen overidentification test, and the Arellano-Bond test for AR(2) serial correlation in the residuals. STATA command `xtabond2` is used for calculating the model parameters.

In line with Pääkkönen's study (2010), we utilize yearly data for the period from 1996 to 2008. We exclude the initial transition years from the analysis, since the outset of transition entailed profound systemic changes (Fidrmuc 2003) and a deep economic recession. We apply the same model to both subsamples while ensuring that a standard set of conditioning variables and standard periods are used. Our base growth model includes two variables: investment and inflation. Investment is included, since it is the key factor in the majority of growth models (Solow 1956). Macroeconomic stability is, in turn, considered a precondition for economic recovery during transition in the post-communist world (Fischer et al. 1996). For these two variables, we do not discuss differences in the coefficient estimates between the evolutionary and revolutionary subsamples, as this is beyond the scope of our research. We only focus on juxtaposing

the impact of formal economic institutions and political indexes on growth rates. Hence, the base model is:

$$\ln Y_{it} = a \ln Y_{it-1} + \beta_1 \ln K_{it} + \beta_2 \ln MS_{it} + \varepsilon_{it} \quad (1)$$

Where Y_{it} is a measure of economic development limited to economic growth operationalized through an annual real GDP growth rate, Y_{it-1} is one-period-lagged economic growth. K stands for the investment in physical capital measured through gross capital formation as a percentage of GDP. MS represents macroeconomic stability captured by annual consumer price inflation. The main source for the above variables is the World Bank electronic database.

We further include formal economic institutions, EI , into the base model:

$$\ln Y_{it} = a \ln Y_{it-1} + \beta_1 \ln K_{it} + \beta_2 \ln MS_{it} + \beta_3 EI_{it} + \varepsilon_{it} \quad (2)$$

Similarly, we include formal political institutions (PI) into the base model as:

$$\ln Y_{it} = a \ln Y_{it-1} + \beta_1 \ln K_{it} + \beta_2 \ln MS_{it} + \beta_3 PI_{it} + \varepsilon_{it} \quad (3)$$

At this stage of the analysis, we are able to compare the coefficient estimates of the economic institutional variable, EI , and the political institutional variable, PI , between the evolutionary and revolutionary subsamples. The model for testing the impact of the quality of political elites and their decision-making on the institution formation process can be presented as follows:

$$EI_{it} = a EI_{it-1} + \rho_1 Life_expect_{it} + \rho_2 PI_{it} + \mu_{it} \quad (4)$$

where EI is economic institutions, PI is political institutions, and $Life_expect$ stands for life expectancy. Life expectancy is included in the equation, since it is considered a standard predictor of formal institutions, along with the latitude variable (see Acemoglu et al. (2001), Islam (2004) for the examples of institutional equations). Life expectancy captures a country's disease environment (McArthur and Sachs 2001), which is believed to have predetermined the kind of formal institutions that initially emerged in a country and persisted over time (Acemoglu et al. 2001). Unlike a more conventional measure of the disease environment, such as settler mortality rates, this variable is available on an yearly basis and for all of the selected countries, including transition economies. Since formal institutions may influence the quality of life and impact life expectancy, we consider this variable endogenous and insert it into the gmmstyle option to instrument it with the lagged values of the variable itself. In contrast, the latitude variable is considered strictly exogenous and is included in the ivstyle option.

To gauge the effects of adjusting national cultures and economic structures to new formal institutions on the quality of institutional grafting processes, we run a multilevel analysis. We use the cross-sectional time series for the period from 1996 to 2008 but treat them as a cross-sectional sample in which years represent cases grouped by countries. The main objective here is to analyze the impact that the quality of economic structures and cultures have on the institution formation process. We expect that countries had a greater improvement in legal institutions when the economic structure was closer to the capitalist world either at the transition's outset or was

reformed as such during the transition.⁴ Similarly, we anticipate that countries with more advanced capitalist values, either at the transition's outset or improved by the transition, were able to build better formal economic institutions.⁵ The change in institutions can hence be modeled as a function of the quality of cultural values and economic structures:

$$EI_CHANGE_{ij} = \gamma_{00} + \gamma_{10}X_{ij} + \gamma_{20}CULTURES_{ij} + \gamma_{30}ECON_STRUCTURE_{ij} + m_{oj} + \varepsilon_{ij} \quad (5)$$

Where *EI_CHANGE* stands for an annual change occurring in each of the selected economic institutions during the period analyzed and is calculated as [(Economic Institutional index in year t - Economic Institutional index in year (t-1)]. *X* is a set of control variables, while *CULTURES* describes the quality of culture in a country. Tabellini (2008) suggests that culture can be approximated through values relevant to obedience, trust, respect, and control over life. We source these variables from the World Values Survey (WVS). Obedience represents the percentage of people in the sample who mentioned obedience as an important factor in society. Trust and respect are positive responses to questions about trusting most of the people and whether most people show tolerance and respect towards others. Control is operationalized through the question about how much freedom of choice and control people have over their own lives. We do not construct a single measure out of the four items since principle component factor analysis suggests that the four items load poorly on the same construct given the small sample of transition economies. *ECON_STRUCTURE* stands for the quality of economic structures and reflects a government's success in adjusting a country's economic structures to the standards of a free market economy. We follow Eicher and Schreiber (2010) and Hall and Jones (1999) and utilize the EBRD measures to construct a structural policy index, consisting of price liberalization, foreign exchange/trade liberalization, small/large scale privatization, enterprise reform, competition policy reform, banking sector reform, and non-banking financial institutional reform. We use the STATA *predict* option for factor analysis to construct a single construct. m_{oj} is the variance at the group level, and ε_{ij} is the variance at the year level. We limit this analysis to the base revolutionary subsample, since the structural policy index is only available for this set of economies.

5. Empirical results

The empirical results largely support our expectations, suggesting that the relationship between economic institutions and economic growth acquires specific characteristics during transition. The economic institutional index strongly affects growth rates of economies operating within the institutions formed via evolutionary

⁴ In contrast to CIS countries, the existence of private property in Central Europe contributed to the de-politization of the economy by creating wealthy businessmen and an economic elite. This helped to minimize rent-seeking opportunities during transition and established demand for introducing effective private property rights.

⁵ For instance, Poland developed capitalist informal norms in the context of private business interactions due to a small but legitimate number of private firms that were tolerated throughout the communist regime (Boettke et al. 2008). Following the collapse of communism and the subsequent privatization efforts, it was easier for both the population and politicians to build on these underlying behavioral values and to accept private business on a much grander scale (Boettke et al. 2008). This stands in stark contrast to the CIS countries where the value of private property was nonexistent during Soviet times.

institutional change for both the base and extended subsamples (see tables 3 and 4). By contrast, the economic performance of countries in the base revolutionary subsample lacks a positive association with formal economic institutions in the short run. However, we establish a strong positive relationship between institutional indexes and growth rates when the analysis shifts to the extended revolutionary subsample. A careful revision of the country list for this subsample and retaining only those countries⁶ that strictly meet the selection criteria provides results that are nonetheless in line with hypothesis 1. We find that property rights protection and contract enforcement legislation have a positive impact on economic growth, but this impact is substantially smaller in the case of the extended revolutionary sample. Moreover, these results stand up to the alternative model specification choice and to the exclusion of resource-rich countries from the extended subsamples.

In the long run, economic institutions of countries in both the base and extended revolutionary subsamples developed some relationship with rates of economic growth. If relating lagged values of institutional indexes to growth rates (see column 1 in tables 5 and 6), one finds a positive association between the two variables, which is commensurate with hypothesis 2(a). A closer analysis of institutional effects on economic performance when such institutions are formed revolutionarily suggests that this impact is often non-linear, which is consistent with hypothesis 2(b). The negative coefficient on the main effect of the economic institutional variable (see column 2 in tables 5 and 6) suggests that when new formal institutions are of poor quality (the values of the legal variable are low), such formal institutions constitute a negative growth factor. In turn, a positive quadratic term means that, as the quality of institutions improves, the negative effect is offset and formal institutions become a positive determinant of economic growth. A similar non-linear relationship was also found by Fidrmuc and Tichit (2009) in the relationship between economic reforms and economic growth in the post-communist region and by De Melo et al. (1997) concerning the impact of structural reforms on economic growth.

The initially negative impact of transition reforms on economic growth is often explained by high adjustment costs (De Melo et al. 1997), which turns into a positive impact in subsequent years (Falcetti et al. 2000). Alternatively, this may imply that when the quality of formal institutions is poor, they are either of an extractive nature or allow wide rent-seeking in the economy, hindering economic development. The example of privatization in the former Soviet Republics demonstrates how establishing the institution of private property, which was necessary for wide-scale privatization, could harm local economies by causing a considerable output drop.

This non-linear relationship between economic institutions and rates of economic growth suggests that economies from the revolutionary subsamples may grow fast even if formal institutions are poorly developed. Accounting for the level of institutional enforcement may contribute to clarifying these unusual results:⁷ By allowing the economic institutional variable and the corruption perceptions index to interact, we obtained evidence for the smoothing effects of poor enforcement of confusing formal

⁶ The following countries were excluded from the extended revolutionary subsample for the revised analysis: Bangladesh, Brazil, Guatemala, Indonesia, El Salvador, Lesotho, and Mozambique. These countries are retained for further analysis to keep both subsamples (evolutionary and revolutionary) similar in size.

⁷ We use a corruption perceptions index constructed by Transparency International to measure the level of enforcement of formal economic institutions. The values of the index vary from 1 (complete corruption) to 10 (no corruption).

institutions on the dynamics of economic growth. Accordingly, improvements in enforcement levels of formal institutions without improving such institutions may impair economic development in transition countries (see column 4 in table 5). If the enforcement mechanism is coupled with improving the quality of property rights and contract enforcement legislation, the main negative effect is offset and reducing corruption fosters economic development. We found a similar relationship for the extended revolutionary sample, but the results remain statistically insignificant, suggesting that post-communist economies may represent a particular group (see table 6).

Tables 7 to 10 juxtapose the impact of political settings on economic growth between the evolutionary and revolutionary subsamples. The results are largely consistent with the expectations formulated in hypothesis 3 and suggest that economies operating within an institutional framework formed revolutionarily are more sensitive to the quality of their political sector, especially concerning political decision-making. The policymaking quality index develops a closer relationship with rates of economic growth when the formation of economic institutions follows a revolutionary pathway. For countries that underwent the evolutionary method of institution building, it is more important that strong democratic settings exist to allow these economies to grow faster. The results also remain robust to alternative model specification choices or to the exclusion of resource rich countries from the extended subsamples.

Interestingly, our results also indicate that the policymaking quality may negatively impact growth rates of countries in the evolutionary subsample. This is in line with existing studies, since many governmental policies were found to have a mixed effect on economic growth depending on a country's economic development level. In Scandinavian countries, welfare state policies are, for instance, believed to discourage people from saving, leading to a reduction in capital available for reinvestment and thereby reducing growth rates. Furthermore, the taxes necessary to finance such policies may reduce the return to innovation. Studies for Latin America, in contrast, demonstrate that welfare state policies are a positive determinant for growth, since they help to reduce income inequalities that are detrimental to economic growth. A wide income distribution may cause social and political unrest, which discourages economic activity and investment and slows down growth (see Arjona et al. 2002 for more details).

Table 11 furnishes evidence supporting hypothesis 4 and suggests that the quality of the political environment is of utmost importance in forming economic institutions when such institutions are established revolutionarily. Economic institutions prove particularly sensitive to the quality of political decision-making. By contrast, countries that largely rely on the evolutionary method of institutional change become relatively independent from the quality of their political system and policymaking. These results hold true for both base and extended subsamples.

Additionally, table 12 contains results suggesting that post-communist countries which underwent more structural reforms and which are characterized by better cultural values are associated with greater improvements in formal economic institutions. This is consistent with hypothesis 5. Controlling for EU membership or membership in the former Soviet Union does not change the logic of our findings. Similarly, excluding resource rich countries from the subsample does not change the results.

Table 3. The impact of economic institutional indexes on economic growth during evolutionary institutional change

| VARIABLES | Evolutionary institutional change | | | | |
|---|-----------------------------------|-----------|--------------------|-----------|-----------|
| | Base subsample | | Extended subsample | | |
| | (1) | (2) | (3) | (4) | (5) |
| Ln(GDP_growth_rate _{t-1}) | 0.330* | -0.095*** | 0.882** | -0.121*** | -0.245*** |
| | (0.173) | (0.019) | (0.437) | (0.005) | (0.007) |
| Ln(capital formation) | -0.162 | 4.154*** | -1.737 | 2.808*** | 4.545*** |
| | (2.366) | (0.537) | (3.938) | (0.223) | (0.232) |
| Ln(inflation) | 0.122 | -0.490*** | -0.129 | -0.373*** | -0.337*** |
| | (0.485) | (0.084) | (0.495) | (0.035) | (0.043) |
| Economic institutions | 1.032* | 0.219** | 1.211** | 0.121*** | 0.160*** |
| | (0.573) | (0.105) | (0.556) | (0.024) | (0.012) |
| <i>Number of instruments</i> | 9 | 21 | 9 | 40 | 32 |
| <i>Hansen test of overid. restrictions (Prob > chi2)</i> | 0.170 | 0.507 | 0.201 | 0.301 | 0.383 |
| <i>Arellano-Bond test for AR(2)(Pr > z)</i> | 0.885 | 0.104 | 0.278 | 0.241 | 0.210 |
| <i>Number of observations</i> | 128 | 128 | 236 | 236 | 190 |
| <i>Number of countries</i> | 22 | 22 | 42 | 42 | 33 |

Note: Standard errors in parentheses. Columns 1 and 2 report results for the base subsample; Columns 3, 4 and 5 contain results for the extended subsample. Column (1): All the variables specified in the model are included in the gmmstyle option. In addition to the specification choices described in the methodological section of the manuscript, we use the sub-option nolevelq that invokes difference instead of system GMM. Instruments are restricted to the second and third lags of the respective variables; Column (2): Time dummies appear in the ivstyle option. An alternative specification of the model is used such as restricting instruments only to the third, fourth and fifth lags of the respective variables; Column (3): The model used in Column 1 is applied to the extended revolutionary sample; Column (4) Instruments are restricted to the fifth lags of the respective variables and the collapse sub-option is omitted. Time dummies are included in the ivstyle option; Column (5) Resource rich countries are excluded from the analysis.

*p < .10. ** p < .05. *** p < .01.

Table 4. The impact of economic institutional indexes on economic growth during revolutionary institutional change

| VARIABLES | Revolutionary institutional change | | | | | | | |
|---|------------------------------------|-----------|--------------------|----------|-----------|----------------------------|-----------|-----------|
| | Base subsample | | Extended subsample | | | Revised extended subsample | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Ln(GDP_growth_rate _{t-1}) | 0.179 | 0.207*** | 0.249 | 0.140*** | 0.323*** | 0.033 | -0.030 | -0.004 |
| | (0.144) | (0.040) | (0.169) | (0.025) | (0.045) | (0.192) | (0.022) | (0.025) |
| Ln(capital formation) | -0.913 | -0.044 | 1.395 | -0.186 | -1.137*** | 1.586 | 1.075*** | 1.155*** |
| | (1.822) | (0.238) | (2.182) | (0.212) | (0.142) | (1.553) | (0.149) | (0.102) |
| Ln(inflation) | 0.191*** | -0.126*** | -0.430 | 0.030** | -0.058** | -0.270 | -0.100*** | -0.105*** |
| | (0.063) | (0.033) | (0.321) | (0.012) | (0.023) | (0.168) | (0.012) | (0.011) |
| Economic institutions | -0.367 | -0.023 | -0.004 | 0.200*** | 0.128*** | -0.186 | 0.054** | 0.045 |
| | (0.266) | (0.025) | (0.254) | (0.007) | (0.031) | (0.282) | (0.026) | (0.030) |
| <i>Number of instruments</i> | 9 | 17 | 9 | 40 | 32 | 9 | 32 | 32 |
| <i>Hansen test of overid. restrictions</i> (Prob > chi2) | 0.623 | 0.330 | 0.292 | 0.435 | 0.292 | 0.574 | 0.349 | 0.394 |
| <i>Arellano-Bond test for</i> <i>AR(2)(Pr > z)</i> | 0.400 | 0.349 | 0.504 | 0.106 | 0.348 | 0.407 | 0.301 | 0.388 |
| <i>Number of observations</i> | 130 | 130 | 227 | 227 | 209 | 188 | 188 | 180 |
| <i>Number of countries</i> | 21 | 21 | 40 | 40 | 36 | 33 | 33 | 32 |

Note: Standard errors in parentheses. The model specification choices are the same as table 3. Columns (6) to (8) use the specification choices of columns 3 to 5 (table 3) but without the ivstyle option so that the number of instruments are fewer than the number of country groups. The revised extended sample does not include the following countries: Bangladesh, Brazil, Guatemala, Indonesia, El Salvador, Lesotho, and Mozambique.

*p < .10. ** p < .05. *** p < .01.

Table 5. Extended analysis of economic institutional effects on growth for the base revolutionary subsample

| VARIABLES | Base revolutionary subsample | | | |
|---|------------------------------|----------------------|----------------------|----------------------|
| | (1) | (2) | (3) | (4) |
| Ln(GDP_growth_rate _{t-1}) | 0.295*** (0.098) | 0.385*** (0.097) | 0.138*** (0.028) | 0.166*** (0.049) |
| Ln(capital formation) | -0.034 (0.324) | -0.205 (0.372) | -0.382*** (0.126) | -0.689** (0.273) |
| Ln(inflation) | -0.314*** (0.066) | -0.151** (0.054) | -0.146*** (0.039) | -0.145*** (0.048) |
| Economic institutions _{t-1} | 0.151*** (0.049) | | | |
| Economic institutions | | -2.065*** (0.723) | -0.031 (0.041) | -0.457* (0.223) |
| Economic institutions_2 | | 0.215** (0.076) | | |
| Cpi | | | 0.423*** (0.130) | -0.424 (0.439) |
| Economic institutions * Cpi | | | | 0.143* (0.069) |
| <i>Number of instruments</i> | 16 | 17 | 19 | 19 |
| <i>Hansen test of overid. restrictions (Prob > chi2)</i> | 0.159 | 0.457 | 0.494 | 0.410 |
| <i>Arellano-Bond test for AR(2)(Pr > z)</i> | 0.713 | 0.774 | 0.413 | 0.428 |
| <i>Number of observations</i> | 113 | 130 | 126 | 126 |
| <i>Number of countries</i> | 21 | 21 | 21 | 21 |

Note: Standard errors in parentheses. In addition to specification choices described in the methodological section of the manuscript, we use the sub-option `noleveq` that invokes difference instead of system GMM. All the variables specified in the model are included in the `gmmstyle` option. Instruments are restricted only to the second or third lags of the respective variables.

* $p < .10$. ** $p < .05$. *** $p < .01$.

Table 6. Extended analysis of economic institutions' effects on growth for the extended revolutionary subsample

| VARIABLES | Extended revolutionary subsample | | | |
|---|----------------------------------|----------|----------|----------|
| | (1) | (2) | (3) | (4) |
| Ln(GDP_growth_rate _{t-1}) | 0.310*** | 0.395*** | 0.377*** | 0.371*** |
| | (0.074) | (0.091) | (0.061) | (0.063) |
| Ln(capital formation) | -0.592 | -0.369 | 0.523** | 0.481* |
| | (0.404) | (0.386) | (0.247) | (0.267) |
| Ln(inflation) | -0.249*** | -0.165* | -0.131** | -0.131** |
| | (0.082) | (0.087) | (0.050) | (0.050) |
| Economic institutions _{t-1} | 0.384*** | | | |
| | (0.073) | | | |
| Economic institutions | | -1.810* | 0.168** | 0.050 |
| | | (1.072) | (0.066) | (0.249) |
| Economic institutions_2 | | 0.206* | | |
| | | (0.116) | | |
| Cpi | | | -0.198** | -0.491 |
| | | | (0.074) | (0.547) |
| Economic institutions * Cpi | | | | 0.043 |
| | | | | (0.084) |
| <i>Number of instruments</i> | 16 | 17 | 26 | 26 |
| <i>Hansen test of overid. restrictions (Prob > chi2)</i> | 0.099 | 0.101 | 0.155 | 0.187 |
| <i>Arellano-Bond test for AR(2)(Pr > z)</i> | 0.846 | 0.797 | 0.529 | 0.579 |
| <i>Number of observations</i> | 203 | 227 | 259 | 259 |
| <i>Number of countries</i> | 40 | 40 | 40 | 40 |

Note: Standard errors in parentheses. The model specification choice is the same as table 5.

* p < .10. ** p < .05. *** p < .01.

Table 7. The impact of democratic settings quality on economic growth during evolutionary institutional change

| VARIABLES | Evolutionary institutional change | | | | | |
|---|-----------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | Base subsample | | | Extended subsample | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Ln(GDP_growth_rate _{t-1}) | -0.084** (0.039) | -0.144*** (0.011) | 0.034 (0.161) | 0.099 (0.149) | -0.047** (0.018) | -0.191*** (0.030) |
| Ln(capital formation) | -0.341 (1.173) | 1.279** (0.609) | 3.618** (1.563) | 1.029 (1.802) | 1.552*** (0.363) | 2.909*** (0.544) |
| Ln(inflation) | -0.094 (0.099) | -0.349*** (0.066) | -1.242*** (0.303) | -0.630*** (0.200) | -0.373*** (0.034) | -0.215*** (0.027) |
| Democratic settings quality | 3.426*** (0.623) | 0.783* (0.426) | 2.420* (1.221) | -1.068 (0.900) | 0.634** (0.273) | 0.495** (0.207) |
| <i>Number of instruments</i> | 13 | 19 | 11 | 11 | 35 | 29 |
| <i>Hansen test of overid. restrictions (Prob > chi2)</i> | 0.102 | 0.359 | 0.464 | 0.126 | 0.318 | 0.229 |
| <i>Arellano-Bond test for AR(2)(Pr > z)</i> | 0.103 | 0.109 | 0.102 | 0.688 | 0.575 | 0.326 |
| <i>Number of observations</i> | 100 | 100 | 100 | 194 | 194 | 148 |
| <i>Number of countries</i> | 22 | 22 | 22 | 44 | 44 | 33 |

Note.: Standard errors in parentheses. Columns 1, 2, and 3 report results for the base subsample; Columns 4, 5 and 6 contain results for the extended subsample. Column (1): In addition to specification choices described in the methodological section of the manuscript, we use the sub-option `noleveq` that invokes difference instead of system GMM. All the variables specified in the model are included in the `gmmstyle` option; Column (2): Additionally, time dummies appear in the `ivstyle` option; Column (3): An alternative model specification choice is used such as restricting instruments only to the third or fourth lags of the respective variables; Column (4): Specification choice of Model 3 is applied to the extended subsample; Column (5): The collapse sub-option is omitted; Column (6): Resource rich countries are deleted from the analysis.

* $p < .10$. ** $p < .05$. *** $p < .01$.

Table 8. The impact of democratic settings quality on economic growth during revolutionary institutional change

| VARIABLES | Revolutionary institutional change | | | | | |
|---|------------------------------------|----------------------|--------------------|---------------------|----------------------|---------------------|
| | Base subsample | | | Extended subsample | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Ln(GDP_growth_rate _{t-1}) | -0.241** (0.085) | -0.021* (0.011) | 0.414 (0.259) | 0.439** (0.187) | 0.240*** (0.052) | 0.226*** (0.046) |
| Ln(capital formation) | 0.298 (0.404) | 0.429*** (0.062) | 0.152 (0.241) | -0.233 (0.588) | 0.111 (0.080) | -0.125 (0.141) |
| Ln(inflation) | -0.014 (0.039) | -0.113*** (0.026) | -0.293* (0.143) | -0.461** (0.201) | -0.136*** (0.048) | -0.106** (0.050) |
| Democratic settings quality | -0.967 (0.764) | 0.262 (0.380) | 0.199 (1.348) | 4.222*** (1.315) | 2.713*** (0.305) | 1.906*** (0.375) |
| <i>Number of instruments</i> | 13 | 19 | 11 | 11 | 35 | 29 |
| <i>Hansen test of overid. restrictions (Prob > chi2)</i> | 0.102 | 0.243 | 0.106 | 0.110 | 0.211 | 0.229 |
| <i>Arellano-Bond test for AR(2)(Pr > z)</i> | 0.532 | 0.338 | 0.930 | 0.816 | 0.817 | 0.185 |
| <i>Number of observations</i> | 116 | 116 | 116 | 208 | 208 | 187 |
| <i>Number of countries</i> | 21 | 21 | 21 | 41 | 41 | 37 |

Note: Standard errors in parentheses. The model specification choice is the same as table 7. Columns 1, 2, and 3 report results for the base subsample; Columns 4, 5 and 6 contain results for the extended subsample.

* p < .10. ** p < .05. *** p < .01.

Table 9. The impact of policymaking quality on economic growth during evolutionary institutional change

| VARIABLES | Evolutionary institutional change | | | | | |
|---|-----------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | Base subsample | | | Extended subsample | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Ln(GDP_growth_rate _{t-1}) | -0.172*** (0.036) | -0.170*** (0.018) | 0.175 (0.107) | 0.275 (0.176) | -0.069*** (0.022) | -0.241*** (0.023) |
| Ln(capital formation) | 0.766 (0.864) | 1.633** (0.732) | 1.654** (0.702) | 1.518 (1.181) | 1.995*** (0.353) | 3.226*** (0.386) |
| Ln(inflation) | -0.331** (0.149) | -0.452*** (0.091) | -0.776*** (0.097) | -0.589*** (0.168) | -0.430*** (0.050) | -0.203*** (0.066) |
| Policy-making quality | -1.422* (0.699) | -0.603 (0.357) | -0.437** (0.192) | 1.479 (1.631) | -0.820** (0.358) | -0.342 (0.320) |
| <i>Number of instruments</i> | 13 | 19 | 18 | 11 | 35 | 29 |
| <i>Hansen test of overid. restrictions</i> (Prob > chi2) | 0.188 | 0.384 | 0.331 | 0.088 | 0.329 | 0.420 |
| <i>Arellano-Bond test for AR(2)(Pr > z)</i> | 0.100 | 0.078 | 0.281 | 0.919 | 0.657 | 0.391 |
| <i>Number of observations</i> | 100 | 100 | 142 | 197 | 197 | 151 |
| <i>Number of countries</i> | 22 | 22 | 22 | 45 | 45 | 34 |

Note: Standard errors in parentheses. The model specification choice is the same as table 7. Columns 1, 2, and 3 report results for the base subsample; Columns 4, 5 and 6 contain results for the extended subsample.

* p < .10. ** p < .05. *** p < .01.

Table 10. The impact of policymaking quality on economic growth during revolutionary institutional change

| VARIABLES | Revolutionary institutional change | | | | | |
|---|------------------------------------|----------------------|----------------------|--------------------|----------------------|----------------------|
| | Base subsample | | | Extended subsample | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Ln(GDP_growth_rate _{t-1}) | -0.238*** (0.056) | -0.067*** (0.019) | 0.364 (0.232) | 0.444** (0.220) | 0.328*** (0.042) | 0.332*** (0.031) |
| Ln(capital formation) | -0.066 (0.506) | 0.269** (0.105) | 0.490 (0.373) | -0.220 (0.667) | 0.433*** (0.089) | 0.473*** (0.065) |
| Ln(inflation) | -0.025 (0.034) | -0.133*** (0.021) | -0.561*** (0.175) | -0.538* (0.293) | -0.221*** (0.041) | -0.205*** (0.031) |
| Policy-making quality | 0.635 (0.448) | 0.828*** (0.156) | 0.919*** (0.320) | 1.978* (1.021) | 0.533*** (0.156) | 0.414*** (0.113) |
| <i>Number of instruments</i> | 13 | 19 | 11 | 11 | 35 | 35 |
| <i>Hansen test of overid. restrictions</i> (Prob > chi2) | 0.120 | 0.255 | 0.097 | 0.068 | 0.173 | 0.297 |
| <i>Arellano-Bond test for AR(2)(Pr</i> <i>> z)</i> | 0.099 | 0.219 | 0.389 | 0.546 | 0.437 | 0.963 |
| <i>Number of observations</i> | 116 | 116 | 116 | 208 | 208 | 187 |
| <i>Number of countries</i> | 21 | 21 | 21 | 41 | 41 | 37 |

Note: Standard errors in parentheses. The model specification choice is the same as table 7. Columns 1, 2, and 3 report results for the base subsample; Columns 4, 5 and 6 contain results for the extended subsample.

* p < .10. ** p < .05. *** p < .01.

Table 11. The impact of political indexes on formal economic institutions, by mode of institutional formation

| VARIABLES | Evolutionary institutional change | | | | Revolutionary institutional change | | | |
|---|-----------------------------------|--------------------|----------------------|---------------------|------------------------------------|---------------------|---------------------|---------------------|
| | Base subsample | | Extended subsample | | Base subsample | | Extended subsample | |
| Economic_institutions _{t-1} | 0.993*** (0.090) | 0.611** (0.279) | 0.864*** (0.027) | 0.868*** (0.035) | 0.360 (0.253) | 0.431*** (0.070) | 0.301*** (0.039) | 0.302*** (0.028) |
| Life expectancy | 0.003 (0.020) | -0.051 (0.035) | -0.021 (0.029) | -0.020 (0.029) | -0.008 (0.158) | -0.015 (0.048) | 0.131*** (0.013) | 0.061*** (0.022) |
| Democratic settings quality | 0.210 (0.520) | | -0.516*** (0.127) | | -2.544 (3.509) | | 0.628* (0.343) | |
| Policy-making quality | | 1.211 (0.966) | | -0.607 (0.370) | | 1.209*** (0.383) | | 1.354*** (0.149) |
| <i>Number of instruments</i> | 10 | 10 | 28 | 28 | 10 | 10 | 28 | 28 |
| <i>Hansen test of overid. restrictions (Prob > chi2)</i> | 0.286 | 0.104 | 0.243 | 0.519 | 0.373 | 0.099 | 0.134 | 0.116 |
| <i>Arellano-Bond test for AR(2)(Pr > z)</i> | 0.478 | 0.649 | 0.729 | 0.977 | 0.200 | 0.182 | 0.106 | 0.105 |
| <i>Number of observations</i> | 132 | 132 | 262 | 262 | 102 | 102 | 225 | 225 |
| <i>Number of countries</i> | 22 | 22 | 44 | 44 | 20 | 20 | 42 | 42 |

Note: Standard errors in parentheses. We use the sub-option `noleveq` that invokes difference instead of system GMM. All the variables specified in the model are included in the `gmmstyle` option. Time dummies and the latitude variable are included in the `ivstyle` option. We restrict instruments only to the third lags of the respective variables. The `collapse` sub-option is used for the base samples to reduce the number of instruments but is omitted for the extended samples in order to achieve satisfactory results for the overidentification test.

* $p < .10$. ** $p < .05$. *** $p < .01$.

Table 12. Associations between changes in economic institutions, cultures, and economic structures

| VARIABLES | (1) | (2) | (3) | (4) |
|---------------------|----------|----------|----------|----------|
| Economic structure | 0.548* | 0.660** | 0.579* | 0.601* |
| | (0.311) | (0.319) | (0.329) | (0.342) |
| Social trust | -2.460 | -0.517 | 0.926 | 1.554 |
| | (2.969) | (3.251) | (3.351) | (3.518) |
| Freedom of choice | -0.579** | -0.441* | -0.333 | -0.264 |
| | (0.225) | (0.244) | (0.252) | (0.273) |
| Obedience | -1.588 | -1.699 | -2.123* | -2.210* |
| | (1.163) | (1.158) | (1.179) | (1.212) |
| Tolerance | 4.223** | 5.207*** | 6.203*** | 6.183*** |
| | (1.809) | (1.926) | (2.011) | (2.064) |
| Life expectancy | -0.127* | -0.116 | -0.133* | -0.131* |
| | (0.072) | (0.072) | (0.072) | (0.074) |
| Latitude | -3.313 | -5.826* | -7.981** | -5.907 |
| | (2.886) | (3.369) | (3.609) | (4.596) |
| Civil liberties | 0.151 | 0.116 | 0.166 | 0.280 |
| | (0.157) | (0.158) | (0.160) | (0.215) |
| Soviet Union dummy | | 0.519 | 0.640* | 0.504 |
| | | (0.365) | (0.370) | (0.421) |
| EU membership dummy | | | 0.616 | 0.576 |
| | | | (0.390) | (0.401) |
| Constant | 12.570** | 11.060* | 11.490* | 9.521 |
| | (6.134) | (6.186) | (6.141) | (6.808) |
| Observations | 150 | 150 | 150 | 141 |

Note: Standard errors in parentheses. The associations should be interpreted with some caution since the cause-effect mechanism can run in both directions. Model (4) excludes resource rich countries.

* $p < .10$. ** $p < .05$. *** $p < .01$.

Overall, the empirical analysis supports the original hypotheses. Moreover, the results can be considered robust given the selected robustness check strategies: (1) the evolutionary subsample included economically developing countries to avoid the difference in coefficients being caused by variances in the level of economic or institutional maturity between the two subsamples; (2) we included non-post-communist countries in the revolutionary subsample to verify whether the specificities found for post-communist countries are universal or unique to the post-communist world; (3) we eliminated resource rich countries and small economies from both subsamples. The list of such countries was retrieved from Mankiw et al. (1992); (4) where possible, we controlled for EU membership in the base revolutionary subsample; (5) where possible, we controlled for former Soviet Union membership to verify whether the peculiarities in the relationship between formal institutions and economic growth are caused by the Soviet Union legacy. One should note that the results for transition economies show slight peculiarities as compared to other countries from the revolutionary subsample. We believe that this difference is due to specificities of the socialist regime. While Communism represented a dictatorship, it was characterized by relatively high industrialization levels, albeit militarized to a great extent, a highly educated labor force, high levels of urbanization, and extended social programs.

6. Conclusion and discussion

This study confirms the idea that the impact of formal economic institutions on growth rates may vary depending on how such institutions emerge. Our paper demonstrates

that the relationship between legal rules and economic growth can be peculiar when these rules are created via revolutionary institutional change characterized by a top-down approach to institution building. This mode of institution emergence can create incompatibilities between the logic of the new formal institutions and existing cultures, on the one hand, and local economic structures, on the other hand. Since institution building is handled by politicians and occurs in the political sector, the quality of political institutions and political decision-making determines the quality of the new formal institutions and growth rates in the course of transition. Our analysis provides empirical evidence supporting both of these ideas. A weak political context leads to more extractive legal institutions that harm growth. High quality political institutions, in contrast, produce well defined and efficiently enforced formal institutions and enable rapid economic growth. Good political institutions are also more likely to detect and eliminate gaps in the logic of the new formal institutions and the two structures, thereby offsetting frictions in the economy caused by these incompatibilities and enabling the local economy to grow faster.

Drawing on this understanding of growth determinants during transition, we suggest that reforms begin with the political sector and aim to introduce robust political settings. When such political contexts are in place, the country can proceed with building new property rights and contract enforcement legislation while ensuring that this legislation is in tune with local cultures and economic structures. If this is not the case, structural policies and policies aimed at strengthening new modes of thinking should be introduced. In this way, transitions to new political and economic regimes may have more chances of success.

Future research is needed to eliminate three major limitations of our study. First, a more careful grouping of countries for both subsamples is necessary to eliminate stark heterogeneities in their political, economic, social, and historical characteristics. Second, one should consider integrating countries with unstable regime trends into the analysis. Finally, alternative economic development measures should be used to demonstrate the robustness of our findings on the impact that the mode of institution building has on patterns of economic progress in the world.

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Appendix 1. GDP per capita in the selected post-communist countries at the outset of transition (1990), in 1990 International Geary-Khamis dollars

| Country | GDP per capita |
|-----------------|----------------|
| Albania | 2,499 |
| Armenia | 6,066 |
| Azerbaijan | 4,639 |
| Bulgaria | 5,597 |
| Croatia | 7,351 |
| Czech Republic | 8,895 |
| Estonia | 10,820 |
| Georgia | 7,616 |
| Hungary | 6,459 |
| Kyrgyz Republic | 3,602 |
| Latvia | 9,916 |
| Lithuania | 8,663 |
| Macedonia | 3,972 |
| Moldova | 6,170 |
| Poland | 5,113 |
| Romania | 3,511 |
| Russia | 7,779 |
| Serbia | 5,011 |
| Slovakia | 7,763 |
| Slovenia | 10,860 |
| Ukraine | 6,027 |

Source: Maddison Historical GDP Data

Appendix 2. Description of country choice for the evolutionary and revolutionary subsamples

| Country | Choice | Notes |
|----------------|--------------------------------------|---|
| Afghanistan | Not included | Recent history of military intervention |
| Albania | Included in the revolutionary sample | |
| Algeria | Not included | Fluctuations in regime trend greater than 3 points |
| Angola | Not included | Insufficient change (the benchmark of 6 not reached) |
| Argentina | Included in the revolutionary sample | |
| Armenia | Included in the revolutionary sample | History of reverse trend but included due to the insufficient number of transition countries in the subsample |
| Australia | Included in the evolutionary sample | Resource rich |
| Austria | Included in the evolutionary sample | |
| Azerbaijan | Included in the revolutionary sample | History of reverse trend but included due to the insufficient number of transition countries in the subsample |
| Bahrain | Included in the evolutionary sample | Resource rich |
| Bangladesh | Included in the revolutionary sample | Fluctuations in regime trend greater than 3 points but after 2006. Slightly insufficient starting point (slightly above -6) |
| Belarus | Not included | Recursive movement to autocracy |
| Belgium | Included in the evolutionary sample | |
| Benin | Included in the revolutionary sample | |
| Bhutan | Not included | Fluctuations in regime trend greater than 3 points |
| Bolivia | Included in the revolutionary sample | |
| Bosnia | Not included | No data on polity scores |
| Botswana | Included in the evolutionary sample | |
| Brazil | Included in the revolutionary sample | Profound political change occurs but in stages. Resource rich |
| Bulgaria | Included in the revolutionary sample | |
| Burkina Faso | Not included | Fluctuations in regime trend greater than 3 points |
| Burundi | Not included | Mixed change, difficult to classify |
| Cambodia | Not included | Insufficient and unstable change |
| Cameroon | Included in the evolutionary sample | |
| Canada | Included in the evolutionary sample | Resource rich |
| Cape Verde | Not included | Insufficient starting point for change (above -6) |
| Cen. Afr. Rep. | Not included | Insufficient change (the benchmark of 6 not reached) |
| Chad | Not included | Insufficient change |
| Chile | Not included | A lot of missing values on key variables |
| China | Included in the evolutionary sample | Resource rich |
| Colombia | Included in the evolutionary sample | |
| Comoros | Not included | Fluctuations in regime trend greater than 3 points |
| Congo | Not included | Insufficient and unstable change |
| Costa Rica | Included in the evolutionary sample | |
| Croatia | Included in the revolutionary sample | Starting point of change is slightly above -6 |
| Cuba | Not included | A lot of missing values on key variables |
| Cyprus | Not included | Insufficient history of regime trend |
| Czech Republic | Included in the revolutionary sample | |
| Denmark | Included in the evolutionary sample | |

| | | |
|--------------------|--------------------------------------|---|
| Djibouti | Not included | Insufficient change |
| Dominican Republic | Not included | Fluctuations in regime trend greater than 3 points |
| Congo Kinshasa | Not included | Insufficient change |
| East Timor | Not included | Insufficient history of regime trend available |
| Ecuador | Not included | Insufficient starting point for change (above -6) |
| Egypt | Included in the evolutionary sample | |
| El Salvador | Included in the revolutionary sample | Change is in the early 1980s and is relatively durable |
| Equatorial Guinea | Included in the evolutionary sample | |
| Eritrea | Not included | Insufficient history of regime trend available |
| Estonia | Included in the revolutionary sample | |
| Ethiopia | Not included | Insufficient change |
| Fiji | Not included | Fluctuations in regime trend greater than three points |
| Finland | Included in the evolutionary sample | |
| France | Included in the evolutionary sample | |
| Gabon | Not included | Insufficient change |
| Gambia | Not included | Change is from democracy to autocracy |
| Georgia | Included in the revolutionary sample | |
| Germany | Included in the evolutionary sample | |
| Ghana | Not included | Fluctuations in regime trend greater than 3 points |
| Greece | Included in the evolutionary sample | |
| Guatemala | Included in the revolutionary sample | Full transition is reached but in two phases with few years apart |
| Guinea-Bissau | Not included | Unstable change |
| Guinea | Included in the evolutionary sample | Resource rich |
| Guyana | Included in the revolutionary sample | Resource rich |
| Haiti | Not included | Fluctuations in regime trend greater than three points |
| Honduras | Not included | Insufficient starting point for change (above -6) |
| Hungary | Included in the revolutionary sample | |
| India | Included in the evolutionary sample | |
| Indonesia | Included in the revolutionary sample | Change is recent (around the year 2000) |
| Iran | Not included | Unstable change |
| Iraq | Not included | Recent history of military occupation |
| Ireland | Included in the evolutionary sample | |
| Israel | Included in the evolutionary sample | |
| Italy | Included in the evolutionary sample | |
| Ivory Cost | Not included | Insufficient change (the benchmark of 6 not reached) |
| Jamaica | Included in the evolutionary sample | |
| Japan | Included in the evolutionary sample | |
| Jordan | Not included | Fluctuations in regime trend greater than 3 points |
| Kazakhstan | Not included | No transition to democracy |
| Kenya | Not included | Mixed change, difficult to classify |
| Korea North | Not included | A lot of missing values on key variables |
| Korea South | Included in the revolutionary sample | Starting point for change is slightly above -6 |
| Kosovo | Not included | Insufficient history of regime trend |
| Kuwait | Not included | |

| | | |
|------------------|--------------------------------------|---|
| Kyrgyzstan | Included in the revolutionary sample | Insufficient change (the benchmark of 6 not reached) but included due to the insufficient number of transition countries in the subsample |
| Laos | Not included | Change is from democracy to autocracy |
| Latvia | Included in the revolutionary sample | |
| Lebanon | Not included | Recent history of military occupation |
| Lesotho | Included in the revolutionary sample | Change is around mid of 1990s. The country has recent experience with democracy. Resource rich |
| Liberia | Not included | A lot of missing values on key variables |
| Libya | Not included | A lot of missing values on key variables |
| Lithuania | Included in the revolutionary sample | |
| Luxembourg | Included in the evolutionary sample | Marked as small economy |
| Macedonia | Included in the revolutionary sample | |
| Madagascar | Included in the revolutionary sample | There is a reverse trend but after 2006 |
| Malawi | Included in the revolutionary sample | |
| Malaysia | Not included | Fluctuations in regime trend greater than 3 points |
| Mali | Included in the revolutionary sample | |
| Mauritania | Not included | Fluctuations in regime trend greater than 3 points |
| Mauritius | Included in the evolutionary sample | |
| Mexico | Included in the evolutionary sample | Resource rich |
| Moldova | Included in the revolutionary sample | |
| Mongolia | Included in the revolutionary sample | |
| Montenegro | Not included | Insufficient history of regime trend |
| Morocco | Included in the evolutionary sample | |
| Mozambique | Included in the revolutionary sample | The upper benchmark of 6 is slightly not reached). Change is around mid of 1990s. |
| Myanmar | Not included | A lot of missing values on key variables |
| Namibia | Not included | Insufficient history of regime trend |
| Nepal | Not included | Fluctuations in regime trend greater than 3 points |
| Netherlands, the | Included in the evolutionary sample | |
| New Zealand | Included in the evolutionary sample | |
| Nicaragua | Not included | Mixed change, difficult to classify |
| Niger | Not included | Unstable change |
| Nigeria | Not included | Unstable change |
| Norway | Included in the evolutionary sample | Resource rich |
| Oman | Included in the evolutionary sample | Resource rich |
| Pakistan | Not included | Fluctuations in regime trend greater than 3 points |
| Panama | Included in the revolutionary sample | |
| Papua N. G. | Not included | Insufficient history of regime trend |
| Paraguay | Included in the revolutionary sample | |
| Peru | Not included | Fluctuations in regime trend greater than 3 points |
| Philippines | Included in the revolutionary sample | |
| Poland | Included in the revolutionary sample | |
| Portugal | Included in the evolutionary sample | Change is shortly after 1970 |
| Qatar | Not included | A lot of missing values on key variables |
| Romania | Included in the revolutionary sample | |
| Russia | Included in the revolutionary sample | Resource rich, Fluctuations in regime trend but retained for the analysis due to the |

| | | |
|---------------------|--------------------------------------|--|
| | | insufficient number of transition countries in the subsample |
| Rwanda | Included in the evolutionary sample | |
| Saudi Arabia | Included in the evolutionary sample | Resource rich |
| Senegal | Not included | A lot of missing values on key variables |
| Serbia | Included in the revolutionary sample | |
| Sierra Leone | Not included | Mixed change, difficult to classify |
| Singapore | Included in the evolutionary sample | |
| Slovak Rep. | Included in the revolutionary sample | |
| Slovenia | Included in the revolutionary sample | |
| Solomon Isl. | Not included | Insufficient history of regime trend |
| Somalia | Not included | Mixed change, difficult to classify |
| South Africa | Not included | Insufficient starting point for change (above - 6) |
| South Sudan | Not included | No data on political trend are available |
| Spain | Not included | A lot of missing values on key variables |
| Sri Lanka | Included in the evolutionary sample | Mild fluctuations in regime trend |
| Sudan | Not included | Fluctuations in regime trend greater than 3 points |
| Suriname | Not included | No data on political trend are available |
| Swaziland | Not included | Mixed change, difficult to classify |
| Sweden | Included in the evolutionary sample | |
| Switzerland | Included in the evolutionary sample | |
| Syria | Included in the evolutionary sample | Fluctuations in regime trend prior 1970 |
| Taiwan | Not included | Change is in many stages |
| Tajikistan | Not included | Insufficient political change (the upper benchmark of 6 not reached) |
| Tanzania | Not included | Insufficient change |
| Thailand | Not included | Fluctuations in regime trend greater than 3 points |
| Togo | Not included | Insufficient change (the upper benchmark of 6 not reached) |
| Trinidad | Included in the evolutionary sample | |
| Tunisia | Included in the evolutionary sample | There is change but gradual |
| Turkey | Not included | Fluctuations in regime trend greater than 3 points |
| Turkmenistan | Not included | No transition to democracy |
| UAE | Not included | Insufficient history of regime trend |
| Uganda | Not included | Fluctuations in regime trend greater than 3 points |
| Ukraine | Included in the revolutionary sample | |
| United Kingdom, the | Included in the evolutionary sample | |
| United States, the | Included in the evolutionary sample | Resource rich |
| Uruguay | Included in the revolutionary sample | History of brief reverse trend shortly after 1970 |
| Uzbekistan | Not included | No transition to democracy |
| Venezuela | Not included | Change is from democracy to autocracy |
| Vietnam | Included in the evolutionary sample | |
| Yemen | Not included | Fluctuations in regime trend greater than 3 points |
| Zambia | Included in the revolutionary sample | Brief history of reverse trend |
| Zimbabwe | Not included | Change is from democracy to autocracy |

Note: List of countries is sourced from <<http://www.systemicpeace.org/polity/polity4.htm>>

Appendix 3. List of countries used in the analysis

| Evolutionary subsamples | | Revolutionary subsamples | |
|-------------------------|---------------------|--------------------------|----------------|
| Base | Extended | Base | Extended |
| Australia | Australia | Albania | Albania |
| Austria | Austria | Armenia | Argentina |
| Belgium | Bahrain | Azerbaijan | Armenia |
| China | Belgium | Bulgaria | Azerbaijan |
| Colombia | Botswana | Croatia | Bangladesh |
| Costa Rica | Cameroon | Czech Republic | Benin |
| Denmark | Canada | Estonia | Bolivia |
| Finland | China | Georgia | Brazil |
| Germany | Colombia | Hungary | Bulgaria |
| India | Costa Rica | Kyrgyzstan | Croatia |
| Ireland | Denmark | Latvia | Czech Republic |
| Israel | Egypt | Lithuania | El Salvador |
| Italy | Equatorial Guinea | Macedonia | Estonia |
| Jamaica | Finland | Moldova | Georgia |
| Japan | France | Poland | Guatemala |
| Netherlands, the | Germany | Romania | Guyana |
| New Zealand | Greece | Russia | Hungary |
| Norway | Guinea | Serbia | Indonesia |
| Sweden | India | Slovakia | Korea South |
| Switzerland | Ireland | Slovenia | Kyrgyzstan |
| United Kingdom, the | Israel | Ukraine | Latvia |
| United States, the | Italy | | Lesotho |
| | Jamaica | | Lithuania |
| | Japan | | Macedonia |
| | Luxembourg | | Madagascar |
| | Mauritius | | Malawi |
| | Mexico | | Mali |
| | Morocco | | Moldova |
| | Netherlands, the | | Mongolia |
| | New Zealand | | Mozambique |
| | Norway | | Panama |
| | Oman | | Paraguay |
| | Portugal | | Philippines |
| | Rwanda | | Poland |
| | Saudi Arabia | | Romania |
| | Singapore | | Russia |
| | Sri Lanka | | Serbia |
| | Sweden | | Slovakia |
| | Switzerland | | Slovenia |
| | Syria | | Ukraine |
| | Trinidad | | Uruguay |
| | Tunisia | | Zambia |
| | United Kingdom, the | | |
| | United States, the | | |
| | Vietnam | | |